



TRANSFORMING MINING SUPPLY CHAIN WITH BLOCKCHAIN TECHNOLOGY

Abstract

Blockchain is an encrypted digital ledger – a chain of unchangeable cryptographic transaction records called blocks, with new transactions added as new blocks to the end of the chain.

Blockchains are distributed across a network of computers, making the records tamper-proof and eliminating the risk of data loss due to a node failure. Addition of new transactions is managed by a consensus mechanism across the network, that removes the need for a central authority. Such blockchain networks can be public or private, with the entire transaction history viewable by any entity in the network. In addition, though there are some infrastructure costs, there are no costs for every transaction addition to the blockchain.

In sum, blockchain is a simple yet innovative way of passing information between multiple parties in a completely secured and automated manner.

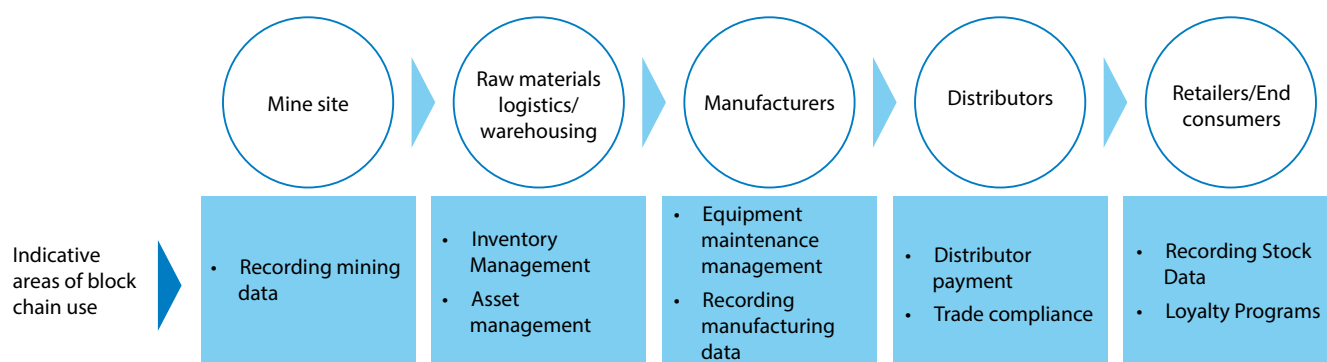
The Blockchain Effect

Blockchain is already being used across several industries including manufacturing, finance, and retail, to track material and transactions of various kinds.

For instance, the global auto giant Ford's pilot blockchain project has been set up in partnership with several companies including IBM, LG Chem, Huayou Cobalt, and RCS Global¹. In this project blockchain is utilized to track Cobalt at each stage of the supply chain, starting from mines to smelting areas to Ford's car assembly plant in the US.



Blockchain can be used at each step of mining supply chain



Other firms having centralized supply chains are using blockchain to transfer funds globally, as the technology enables bypassing of traditional banking channels. Thus, Tomcar, the Australian vehicle manufacturer, pays its suppliers using Bitcoin (a digital currency implementation

using blockchain) and has even enabled purchase of its vehicles through bitcoins².

Blockchain is also being used to monitor the movement of supplies across the supply chain. Global retail company, Walmart uses blockchain extensively to track pork it buys from China. It uses this

technology to keep records of all pieces of meat that includes its origin, processing place, storage location and date of sell³. Many other FMCG companies such as Unilever, Dole foods, Nestle, and Tyson Foods, use blockchain similarly.

Benefits for the Mining Industry

Audit Trails – Blockchain's inherent characteristic of creating a transparent and secure trail for audits, enables trust-building within partner ecosystems. This is of great use especially in the mining industry, considering the high value of goods passing through the supply chain. It can be used to track and trace minerals and precious gems, from concentrates to final products such as diamond, tungsten, tin, and cobalt.

Sustainability – In addition, for sustainability reasons, many manufacturing companies today are reluctant to source minerals that originate from conflict zones,

or from sites that have poor environmental standards or unpaid labor. Global mining companies can tackle these issues through using blockchain to record the lifespan details of a commodity — in particular the place from which it originates — so as to reassure their clients.

Tracing parts – Blockchain can also help mining companies in the tracing of spare parts for mobile mining equipment along with keeping a check on maintenance schedules. This would help in auditing purposes and the limiting of equipment downtime. Another benefit of the technology is the ease with which it can

help the industry implement compliance programs with fewer complications. It would enable lesser paperwork and fewer errors in technical requirements and safety specifications for equipment and processes.

Finally, like in other industries, blockchain can be used effectively for maintaining several other kinds of records such as the movement of personnel and material across mine sites, financial transactions, movement of commodities, or for smart contracts creation.

Mining Implementations

Several mining industry players are already investing significantly in blockchain technologies to improve their supply chains, monitor materials as they move from mines to processing plants, and reduce operation and transaction costs. Below are some real-world implementation examples.

- a. Barrick Gold has partnered with few organizations – Scotiabank, Citibank, Société Générale, and INTL FCStone for
- b. Global mining company BHP Billiton is in the initial stages of using blockchain technology to share information between its contractors, geologists, vendors, and shipping companies. They would use it for various purposes—provide provenance proof⁵, track real-time movements of samples, improve data security and also improve
- c. Global diamond company De Beers has started using blockchain technology to track precious stones from their origin in mines right up to the point of sale to consumers. This ensures traceability, provenance, and authenticity throughout the value chain and improves consumer confidence in the products they are buying⁶

Considering the Challenges

Although Blockchain offers so many benefits, there are some challenges associated with this technology as well. Some of these are highlighted below:

- a. **Scalability:** At a global level in the mining industry supply chain, millions of transactions take place simultaneously. Blockchain suffers from an inherent difficulty with scaling up to such huge volumes of data. Though many studies are being conducted on a pilot basis to solve this issue, it is still a significant challenge that needs to be addressed before widespread deployment.
- b. **Authenticity of data:** Another major challenge associated with the technology is the authenticity of uploaded data. It is difficult to gauge or ensure whether the data uploaded on the Blockchain system is authentic and reflects a correct picture. To solve these problems industry organizations can be set up to check the validity and authenticity of the data, which however may lead to an increase in costs.



The Way Forward

The changing focus of mining companies towards transparency, openness, and sustainability through using blockchain is a positive step for the industry. However, even though several global mining companies are experimenting with the

technology, usage is limited at present and is still nascent.

It is yet to be seen, how a widespread use of blockchain across mining supply chains drastically transforms the industry.

This will require immense commitment from all industry stakeholders be it mining companies, their vendors, or contractors to realize the maximum potential of this breakthrough technology.

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Vinay has over 8 years of experience in manufacturing & market intelligence (sourcing and procurement), and works with category managers in a quasi-consulting manner on strategic planning of vendors, vendor negotiations, and consolidation/diversification of vendors' mix.

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